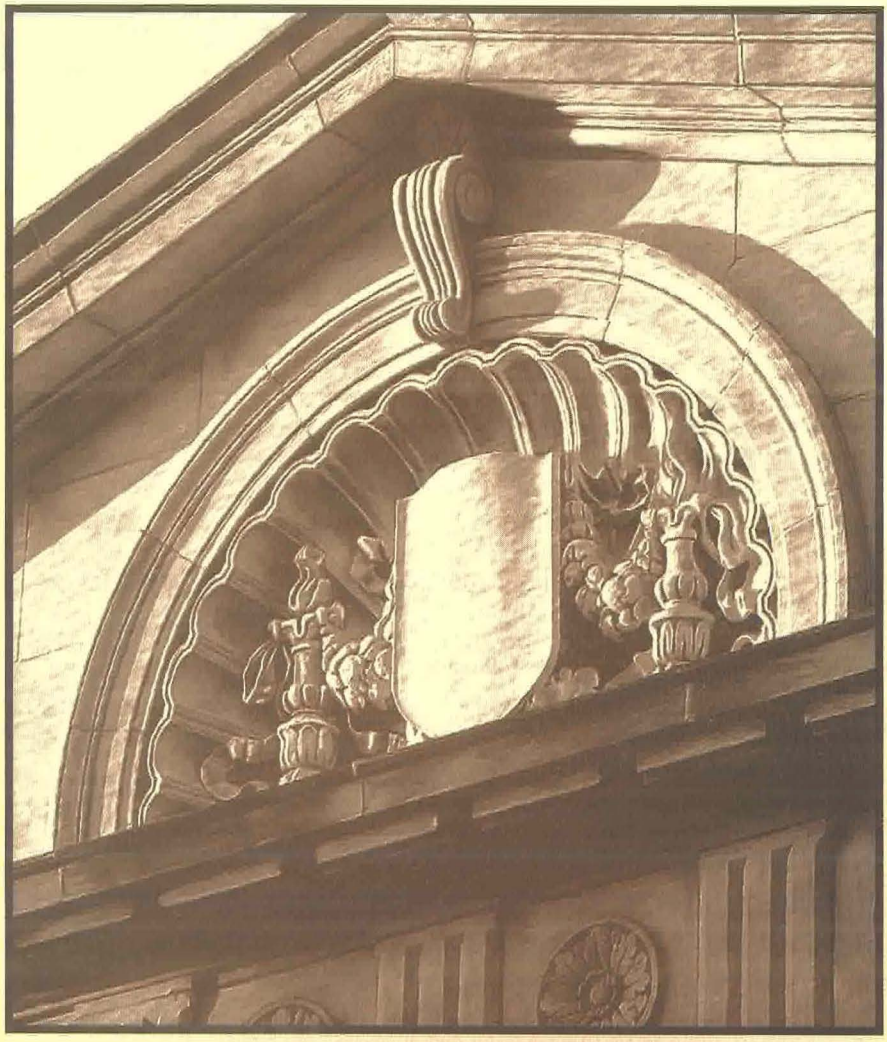
Apr 12th, 6:30 PM - 7:00 PM

Complete 1996 Program

7TH ANNUAL JOHN WESLEY POWELL



April 12-13, 1996

Student Research CONFERENCE

ILLINOIS WESLEYAN UNIVERSITY

THE JOHN WESLEY POWELL STUDENT RESEARCH CONFERENCE

Keynote Address by

Stephen Jay Gould

Professor of Geology and
Curator of Invertebrate Paleontology,
Museum of Comparative Zoology,
Harvard University.

Best Selling Author for *The Panda's Thumb, Ever Since Darwin* and others.
Recipient of 1990 Phi Beta Kappa Award for Science and 1992
Paleontological Society Golden Trilobite Award.

Memorial Student Center, Main Lounge

7:00 p.m., Friday, April 12, 1996

SCHEDULE OF EVENTS

Friday April 12, 1996

5:15 pm	Reception/Buffet Dinner	Science Commons
7:00 pm	Presentation by Stephen Jay Gould (Professor of Geology, Harvard)	Main Lounge

Saturday April 13, 1996

9:00 am	Continental Breakfast and Poster Session A	Science Commons
10:30 am	Oral Presentations (Concurrent Sessions)	Beckman Auditorium Anderson Auditorium
12:00 pm	Lunch	Main Lounge
1:30 pm	Poster Session B	Science Commons
2:30 pm	Alumni Presentations and Certificate Presentations	Anderson Auditorium

The Organizing Committee would like to thank:

Minor Myers, jr, President, IWU
Janet McNew, Provost
Carl Teichman, Assistant to the President
Student Senate
Judy Huff, Natural Science Division Secretary
Lon Shapiro, Visiting Assistant Professor of Computer Science

Members of the Organizing Committee

Jeff Frick, Assistant Professor of Chemistry
Pam Lowry, Assistant Professor of Economics
Johnna Shapiro, Assistant Professor of Psychology

ORAL PRESENTATIONS - SESSION 1
ANDERSON AUDITORIUM
(C-101)

10:30 - 10:45	C.J. Summers
10:45 - 11:00	Matt Dusek
11:00 - 11:15	Heather A. Lang
11:15 - 11:30	Greg Tinkler
11:30 - 11:45	Lesley Hickman

note: * denotes faculty supervisor

Oral Presentation 1.1

OF "MICE" AND MEN
A CRITICISM OF JERRY FODOR'S THEORY OF MENTAL CONTENT

C.J. Summers, Leonard Clapp, Department of Philosophy, IWU

Jerry Fodor is currently one of the top philosophers of mind. One of his main projects is the attempt to naturalize the intentionality of our mental states. Intentionality is roughly cashed out in terms of belief/desire psychology, the theory that humans have beliefs and desires with semantic content or meaning, and that these beliefs and desires are more or less the cause of their actions. The supposition that our mental states have meaning seems in tension with a physicalist ontology, which includes only natural, syntactic objects. It is unclear how neurons or chemicals can have meaning in the way that our mental states appear to be meaningful. Fodor attempts to provide an account of the Intentionality of our mental states which reduces this meaning to purely physical, syntactic entities. If he were successful then he could retain a belief in intentional mental content while remaining a strict physicalist.

The two tools which are available to a physicalist are physical objects and relationships between physical objects. Fodor constructs a theory which equates the meaning of a mental state with the causal relationships it bears to objects in the world. His theory, however, does not succeed as an explanation of meaning because it fails to distinguish meaningful situations from non-meaningful. It therefore falls to pansemanticism, the assignment of meaning to objects, such as smoke, which obviously are not meaningful in the same way as our mental states. Furthermore, given the complexity of relationships in the non-meaningful world it appears likely that a pansemantic counter-example will exist for any theory which attempts to reduce meaning to relationships.

Oral Presentation 1.2

A PROPOSED FAILURE OF THE INTENTIONAL STANCE

Matthew T. Dusek and Lenny Clapp*, Department of Philosophy, IWU

In the contemporary debate in cognitive theory, two dominant trends have emerged concerning belief and desire. In support of a venerable tradition of realism, many theorists affirm a sub-personal cognitive psychology which preserves our folk-psychological intuitions. Alternately, many have bought stock in a promising eliminativism which explains away these complex phenomena in terms of a more ontologically conservative neurophysiology. In response to these dominant schools of thought, Daniel Dennett has developed an increasingly popular philosophy of psychology which culminates in an interpretive method called the Intentional Stance. In this method Dennett attempts to salvage our largely successful folk psychology without the cumbersome problematic of traditional realism. The Intentional Stance, as Dennett envisions it, is rooted in a scientifically respectable objectivity. A consequence of this objectivity will be presented.

Oral Presentation 1.3

THE EFFECTS OF VISUAL FIELD SIZE ON SEARCH PERFORMANCE

Heather A. Lang, Johnna K. Shapiro*, Department of Psychology, IWU
and Lionel R. Shapiro*, Department of Computer Science, IWU

In the fields of both cognitive development and cognitive aging, similar patterns of performance on selective attention tasks have been found between children and older adults. Presently, there exist few studies of selective attention across the lifespan; a 1995 study by Shapiro, Shapiro, Cointin, and Forbes addressed this absence through investigating search performance in a cross-sectional, life-span study. In the Shapiro et al. study, a compelling pattern of performance was found: in conjunction conditions, which require serial searches, older adults' performance differed significantly from the younger adults' performance across increasing display size only in target absent trials. The present study attemped to determine whether such differences arise from perseverative behavior, an indicator of cognitive aging, or merely from physiological slowing. Participants responded to the presence or absence of targets within conjunction arrays of varying field and display sizes. The results of this research will be presented at the conference.

Oral Presentation 1.4

EFFECTS OF CHRONIC INJECTIONS OF THE AMYLOID FRAGMENT, ßA(25–35) INTO THE MEDIAL SEPTAL AREA ON LEARNING AND MEMORY IN THE MALE RAT

Greg Tinkler and Wayne Dornan*, Department of Psychology, IWU

Alzheimer's Disease (AD), a neurodegenerative disorder associated with loss of neurons in the brain, is the most frequent cause of dementia in the elderly, accounting for more than 20 million cases worldwide. Despite a 20 fold increase in the number of reported deaths between 1979 and 1993, presently there is no cure or treatment for AD. While the mechanism of neuronal atrophy in AD is unknown, pathologically, AD is characterized by extracellular deposition of neuritic plaques (NP) and a generation of neurofibrillary tangles typically found in the cerebral cortex, hippocampus, and basal forebrain. Accumulating evidence suggests that the major constituent of NP, a beta–amyloid protein composed of 39–42 amino acids possesses neurotoxic properties. In a previous study done in our laboratory (Neuroreport 1993), we reported that bilateral injections of ßA(25–35) into the hippocampus together with a subthreshold dose of IBO (which by itself has no neurotoxic effects) produced a dramatic disruption in the acquisition of spatial learning in the rat. In contrast, bilateral injections into the hippocampus of two different doses of ßA(25–35) or the incubated form of ßA(25– 35) failed to significantly affect maze acquisition in the rat. Therefore, research done in our laboratory has failed to reveal any effects on spatial learning and memory in the rat following intrahippocampal injections of ßA(25–35) alone. Collectively, this suggests that ßA(25–35) is not directly neurotoxic to hippocampal neurons, but either increases their vulnerability to further insult or acts upon other neurons which synapse upon the hippocampus. An alternative hypothesis is that since the accumulation of amyloid plaques is a gradual process, single injections of ßA(25–35) might not be expected to induce significant hippocampal damage. Recently it has been reported medial septal injections of ßA(25–35) induced a significant reduction of hippocampal choline acetyltransferase (ChAT) without significantly altering the number of non–cholinergic neurons projecting to the hippocampus. This depletion in ChAT was significant on the seventh day postinjection, but had disappeared by day 21. However, no behavioral tests were performed to determine whether any impairments in learning and memory could be correlated to the degree of depletion. The aim of this study was to assess whether multiple injections of ßA(25–35) into the medial septal area would cause a sustained reduction in acetylcholine input to the hippocampus and produce a concomitant disruption in learning and memory.

Oral Presentation 1.5

EFFECTS OF ADRENERGIC AND CHOLINERGIC PHARMACOLOGICAL CHALLENGES ON RADIAL ARM MAZE PERFORMANCE IN MALE RATS WITH 192 IGG SAPORIN INDUCED LESIONS OF THE BASAL FOREBRAIN

Lesley Hickman and Wayne Dornan*, Dept. of Psychology, IWU

Alzheimer's Disease (AD) is a neurodegenerative disease that currently afflicts over 4 million people in the United States, with roughly 100,000 new cases reported every year. This disorder causes gradual deterioration of cognitive functions, particularly learning and memory. Pathologically, AD is manifested by the appearance of neuritic plaques and neurofibrillary tangles, and also by the progressive deterioration of the cortex and septohippocampal pathway, which supplies the hippocampus and cortex with cholinergic fibers. Currently, there is no effective treatment for this disease. Development of drug therapies is hindered by the lack of an animal model of AD that mimics both the pathological and behavioral deficits present in AD. The goal of our lab is to create such a model in the male rat by lesioning the areas that supply acetylcholine, thus imitating the cholinergic degeneration seen in AD. These areas are the nucleus basalis magnocellularis (NBM), which innervates the cortex and amygdala, and the medial septal area (MSA), which innervates the hippocampus. We used a highly specific neurotoxin called 192–IgG–Saporin, a toxin coupled to an antibody directed against a receptor found only on cholinergic neurons. The lesions appeared to have no effect on retention of a previously learned radial arm maze (RAM) memory task (5 arms baited), or acquisition of a task involving a 5–minute delay, when compared to controls who had received identical injections of the vehicle. Because the lack of effect may be due either to compensation by the brain to the loss of these fibers or incomplete lesions of the MSA and NBM, we challenged the cholinergic system and the adrenergic system with scopolamine, a muscarinic receptor antagonist, and an adrenergic antagonist and assessed the effects of these injections using the same RAM delay task. The results of this study will be presented at the conference.

ORAL PRESENTATIONS - SESSION 2
BECKMAN AUDITORIUM
(C-102)

10:30 - 10:45	Gwen Alexander
10:45 - 11:00	Anne Peterson
11:00 - 11:15	Tricia Daley
11:15 - 11:30	Marina Giverts
11:30 - 11:45	Angela Smith

note: * denotes faculty supervisor

Oral Presentation 2.1

EXCHANGE RATE VARIABILITY AND ITS EFFECT ON TRADE: A CASE STUDY OF THE CFA FRANC ZONE

Gwen Alexander and Pam Lowry*, Department of Economics, IWU

The volatility of a nation's exchange rate relative to its trading partners creates a risk for merchants. If we assume risk-averse merchants, volatility should decrease the volume of international trade. This paper addresses the effect of exchange rate variability over a period of 20 years on the imports of the CFA Franc Zone, a monetary union in West and Central Africa. Using the percent change in the Real Exchange Rate index as a measure of variability, a generalized difference equation shows that exchange rate variability does negatively effect the imports of the Franc Zone.

Oral Presentation 2.2

THE POLITICAL AND ECONOMIC FACTORS AFFECTING THE U.S. SUGAR SUBSIDY PROGRAM

Anne Peterson and Frank Boyd*, Department of Political Science

Due to a complex combination of price supports, import quotas, and loans for sugar growers, U.S. consumers pay more to satisfy their sweet tooth. This paper explores the U.S. sugar subsidy program in order to determine why an increasing amount of sugar subsidy is allocated to a decreasing number of sugar growers. Economist Douglass North offers a theory on the autonomous effect of political institutions upon the policymaking, an area which Public Choice theory fails to adequately address. OLS regressions and various cross tab analyses test the impact of economic and political variables upon the level of sugar loans allocated to sugar growers from 1965 to 1992. The House and Senate Agriculture committees and the number of democrats in Congress contribute to explaining the variance in sugar loans. The geographical composition of the Senate Agriculture Committee in particular emerges as statistically significant.

Oral Presentation 2.3

THE EFFECTS OF POLITICAL AND DEMOGRAPHIC VARIABLES ON CHRISTIAN COALITION SUPPORT SCORES

Tricia Dailey and Teri Renner*, Department of Political Science, IWU

Using Congressional Scorecards published by the Christian Coalition and focusing on the House of Representatives and the political and demographic characteristics of the district, the author concludes that political and demographic statistics yield fluctuating results with regard to a representative supporting the Christian Coalition agenda. The data suggests that party identification of the representative and past presidential vote of the district are the most significant variables, while race, education, and income play less of a deciding role in determining support. These findings indicate political factors are the most powerful influence on Christian Coalition ratings. This raises serious questions regarding the organizations claim of impartial interpretation of Christian principles.

Oral Presentation 2.4

IWU BOOKSTORE MARKET RESEARCH PROJECT

Marina Giverts, John Ulrich, Ann Pamperin, and Fred Hoyt*,
Department of Business & Economics, IWU

In the fall of 1995, Dr. Hoyt's two marketing classes were asked to develop a marketing plan for the IWU Bookstore. Ami identified two areas where he wanted help in decision making: (1) What were current student attitudes about the Bookstore, especially services and pricing policies; and (2) what role should the Bookstore play if a student center were to be developed in the Memorial Gym. Students in the class organized themselves into teams which each explored parts of these questions. They presented their findings to the Bookstore committee, but the above named project management team, synthesized the 13 team reports into one final presentation, which we gave to the Administration.

Oral Presentation 2.5

PREDICTING THE PROBABILITY OF DIVORCE AMONG YOUNG MARRIED WOMEN

Angela Smith and Michael Seeborg*, Department of Economics

Over recent decades, we have witnessed drastic changes in American family structure. This has been due in large part to the rapid rise in divorce rates. Previous studies, such as those performed by Gary Becker (1991) and Manser and Brown (1980) have applied economic models to divorce and other family structure decisions. Building on the utility maximization analysis of Manser and Brown, as adapted by John Ermisch (1993), this study uses a logit regression model to predict divorce decisions for an all female sample of respondents, ages 28 to 36. Data are extracted from the National Longitudinal Survey of Youth for the purposes of this study. Economic theory predicts that the probability of divorce is directly related to one's opportunity cost of being married. Using a woman's potential wage rate as a proxy for the economic portion of this opportunity cost, the author of the present study hypothesizes that the probability of a woman seeking divorce will increase with increases in her potential wage rate, holding actual wages and other income constant.

POSTER PRESENTATIONS

Session A: Odd numbered posters are presented

Session B: Even numbered posters are presented

note: * denotes faculty supervisor

Poster Presentation 1

THE "COMBINED" 192 IGG SAPORIN LESION APPROACH AS AN ANIMAL MODEL OF ALZHEIMER'S DISEASE

Katharine Trickle and Wayne Dornan*, Department of Psychology, IWU

While significant progress has been made toward an understanding of the etiology of AD, presently no reliable animal model exists that mimics the profound pathological and behavioral changes that characterize the disease. Accumulating evidence from a large number of studies conducted in the rat reveal that disruption of the functional integrity of the cholinergic basal forebrain projection to the hippocampus and cortex using cholinergic antagonists or specific lesions of the medial septal area (MSA) and nucleus basalis magnocellularis (NBM) induce marked impairments on a variety of behavioral tasks, particularly those that involve spatial learning (e.g. Morris water maze, and radial arm maze). Recently, 192 IgG saporin has been has been reported to be a selective cholinergic neurotoxin. Unilateral injections of 192 IgG saporin into the lateral ventricles induce a 80–90% reduction of acetylcholine levels in the cortex and hippocampus. Although several studies have reported an impairment of spatial learning following intraventricular injections of saporin, all have noted that the effects observed may be due to loss of cerebellar Purkinje cells damaged following intraventricular (i.c.v.) injections of 192 IgG saporin. Indeed, in a recent article published by Walsh, Kelly, Dougherty, Stackman, Wiley, and Kutscher in the journal Brain Research (702: 233–245, 1995) the authors conclude that although 192 IgG saporin is a highly selective cholinergic toxin, the secondary effects induced by i.c.v. injections of 192 IgG saporin " makes the i.c.v. model of 192 IgG–saporin problematic for studying the role of the cholinergic basal forebrain (CBF) in normative behavior and in disease states ". The authors further suggest that site–specific injections of 192 IgG saporin would provide a viable approach to model Alzheimer's disease. In order to circumvent the problem of cerebellar Purkinje cell damage following i.c.v. injection of 192 IgG saporin, while at the same time producing a cholinergic lesion that essentially destroys 80 –90 % of the cholinergic input to the hippocampus and cortex in the rat, we have employed a "combined lesion" technique where animals receive three injections of 192 IgG saporin into the medial septal area, and two (bilateral) injections into the nucleus basalis magnocellularis. In a series of studies that will be presented at this conference, the effects of this "combined " lesion approach on spatial learning in the rat will be reported. We hope that the "combined lesion model " using 192 IgG–saporin by circumventing the inherent problems associated with i.c.v. injections of saporin may provide an avenue to test novel therapeutic drugs to be used as a palliative treatment for Alzheimer's disease.

Poster Presentation 2

PAST, PRESENT AND FUTURE GROWTH OF INTEL CORPORATION

Tina Beaird, Sridhar Veerapaneni and Zhenhu Jin*,
Department of Business, IWU

Created in 1968, Intel Corporation designs, develops, manufactures and markets advanced microcomputer components. It became the world's largest manufacturer of semiconductors in 1992 and its microprocessing chips are currently used in 80% of the world's personal computers. In the past decade Intel's growth has been remarkable. Whether this growth will continue due to numerous changes in the market remains to be seen. Intel's growth in many areas will be analyzed and predictions made about the company's future growth.

Poster Presentation 3

THE HYOID MORPHOLOGY OF *TARSIUS SYRICHTA*: IMPLICATIONS ON PHYLOGENY

James D. Erickson and Thomas Griffiths*, Department of Biology, IWU

Of two major divisions in the primate order, the suborder Anthropoidea contains members whose physical characteristics are more derived while members of the suborder Strepsirhini have more primitive characteristics. The determination of the phylogenetic relationship of one primate family, the *Tarsiidae,* has been somewhat elusive due to its complement both of primitive and derived traits. Thus, placement of the Tarsiers into either of the two suborders has been difficult. We examined the hyoid morphology of one representative species, *Tarsius syrichta,* and searched for clues to ancestry among the arrangement, shape, and attachment of hyoid bones and muscles. By comparing the character states we observed in the specimen with literature descriptions of other primates from both suborders and using phylogenetic computer software, we hoped to gain insight into the Tarsier's relationship within one of the two suborders. Interestingly enough, our data did not assist us in placing the Tarsier family into either suborder but instead reflected its equal relation to both suborders. This might suggest that a third suborder is appropriate to explain the place of the Tarsier family, a suborder which deviated from an ancestor common to the other suborders.

Poster Presentation 4

CHRETIEN DE TROYES AND MARIE DE FRANCE: THEIR WORKS OF SUPPORT

Heather A. Lang and Daniel Terkla*,
Departments of Psychology and English, IWU

Twelfth-century England and France witnessed the beginnings of early political and geographical centralization. At this time, independent nobles began to unify their forces, granting one another political loyalty in exchange for physical protection and an increase in resource availability. Centralization having not yet reached the royal level, early twelfth century social structure was a precarious one, at best, balancing the tensions between the royalty, the upper nobility, and the lower nobility. The medieval royal and baronial courts, then, were placed in a competition to win the alliances of the knights and merchants. Doing so required that the court be renowned for its generosity and its high ideals. Thus, the twelfth-century lord or lady required a vehicle for self-promotion. Such a vehicle was found in men and (less commonly) women of letters, individuals who wrote either at or for a court.

As in previous centuries, this imperial patronage produced literature quite flattering to the ruler who had commissioned or inspired it. The works of two influential twelfth-century authors, Chrétien de Troyes and Marie de France, are no exception. Writing during a period characterized both by legal reform and by tensions between members of the upper and lower nobility, Chrétien and Marie concerned themselves with their patrons' political agendas.

In this study I argue that for Chrétien, who produced much of his work in France under the patronage of Countess Marie de Champagne, this concern involved supporting the baronial viewpoint. Thus, as in such works as Yvain, we find an ineffectual if good-hearted king Arthur, one whose continuing failures to rule properly leave his barons and his knightly servants with true privilege and power. Similarly, I also argue that Marie de France, who likely wrote at the court of King Henry II of England, fills her works with the legal issues so important to her royal patron. Her lais Bisclavret and Lanval both reflect an emphasis on justice and a need for judicial reform.

Poster Presentation 5

SYNTHESIS OF A CHIRAL AMINO ALDEHYDE FROM SERINE

Jim Cwik and Jeffrey A. Frick*, Department of Chemistry, IWU

The overall goal of this project is to synthesize the antibiotic (+)-obafluorin, a β-lactone drug with unusual characteristics. It was found to pass tests indicating the presence of a β-lactam group, the functional group in penicillin. The false positive that obafluorin produced has drawn much attention to it, although its antibacterial activity is relatively low. With the growing resistance of bacterial strains to today's antibiotics becoming a highly publicized issue in the media over the past few months, one can see the importance of a project seeking to develop effective alternative antibiotics. Through the novel synthesis of obafluorin, this project proposes to find not only an easier synthesis than the one found in current literature, but one that will afford more flexibility in the search for analogs.

Specifically, my focus has been on the synthesis of an amino aldeyde intermediate from L-serine. This synthesis converts serine to its lactone ring, which is then converted to the amino aldehyde. The proposed synthesis consists of seven reactions, and our progress will be reported.

Poster Presentation 6

ACHIEVING A BALANCE BETWEEN *AMOUR* AND PROWESS: THE EDUCATION OF EREC AND YVAIN

Lesley Hickman and Dan Terkla*, Department of English, IWU

In my paper I argue that Chrétien de Troyes wrote his romances to educate those young knights (*juvenes*) who had yet to undergo the transition from youthful irresponsibility to responsible seniority. His characters, especially Erec and Yvain, learn to balance their private lives of love and marital responsibilities with their public lives and displays of prowess and *largesse* (generosity).

I use the historical information provided by Georges Duby, Sidney Painter, and Judith Kellogg to explore the economic and social tensions that concerned the knights at the time that Chrétien wrote his romances. The tensions are reflected in his work, and his characters are meant to be role models for the *juvenes*. I compare two of his romances, *Erec and Enide* and *Yvain*. Each concerns a young knight who has the chance to live happily ever after, but loses it through his reckless/irresponsible behavior. The knight undergoes hardships and trials to achieve the balance between *amour* and prowess and to redeem himself to his wife.

I focus on the strong female characters Enide and Lunete, and their roles in the education of these knights. They are represented as feminine, but having masculine qualities and roles, thus mirroring the balance that the knights must also achieve. Enide acts as Erec's conscience and support as he vacillates between being *recreant* and recklessness. Lunete fills the masculine roles of advisor, rescuer, and matchmaker, and also teaches Yvain the value of reciprocity. Chrétien chose female characters to be the educators of his knights because of their ability to successfully combine both feminine and masculine sides.

Poster Presentation 7

RECURRENCE RELATION OF B-SPLINE WAVELETS AND THEIR APPLICATIONS IN SIGNAL PROCESSING

Patrick Crowley and Tian-Xiao He*, Department of Mathematics, IWU

In image processing, medical imaging, speech synthesis, and related fields, it is advantageous to utilize a set of wavelet functions as opposed to a single wavelet. Current wavelets are orthogonal and compact, but not smooth. A set of wavelets based on B-spline wavelets (B-wavelets) would be compact, smooth, and orthogonalized. In this paper, by using the Bezier expression of B-splines, we give a recurrence relation of B-splines with different orders and the corresponding recurrence relation of B-wavelets with different orders.

Poster Presentation 8

PSYCHOLOGY IN THE COURTROOM: THE EFFECTS OF PERSONAL INFORMATION ON JURORS' VERDICTS AND PERCEPTIONS OF A DEFENDANT.

Megan Vitale, Rebecca Meyers, and Johnna Shapiro,
Department of Psychology, IWU.

With the criminal justice system revolving around juror decision- making, many researchers have begun to question the current methods that jurors/juries use to reach a verdict. One method, schema theory, focuses on jurors' use of categories and stereotypes to filter incoming information, which is later used to make decisions. The present study used person and event schemas in order to note the effects of different schema types on juror/jury decision making and perception of the defendant. The impact of juror decision- making in individual vs. group settings was also explored. Data analyzed to date will be presented and the implications of schema theory for the jury system will be discussed.

Poster Presentation 9

HABITAT EDGE AND NEST PREDATION IN HOUSE WRENS

Daniel L. Moore and R. Given Harper*, Department of Biology, IWU

Nest predation is a strong selection pressure upon many avian species. While habitat edges are popular breeding sites for many bird species, predation rates are generally higher on edges compared to interior habitat sites. The role of this "edge effect" has become more important in the midwestern United States as woodland fragmentation has increased, and it has been implicated as a possible factor in the decreasing populations of many woodland breeding birds. The conservation of woodland bird species depends upon understanding the factors affecting their population declines, which this study attempts to address. Nest predation rates of House Wrens (Troglodytes aedon) were documented from May-September, 1982-1994 in 585 nest boxes in central Illinois. The study site consisted of 108 ha of deciduous forest surrounded by cultivated fields. The two major categories of nest predation were by other birds (mostly by other House Wrens) and snakes, and by Raccoons (Procyon lotor). There was a significant year effect on nest predation rates in both categories, but there was no significant relationship between nest predation rates and distance from habitat edges. Larger broods (i.e. number of nestlings) had significantly higher Raccoon nest predation rates than smaller broods. Edge type did not significantly affect apparent avian and snake nest predation rates, but nests along riverine habitat edges suffered significantly higher Raccoon nest predation rates than nests located along either abrupt or gradual habitat edges. The patterns of nest predation documented in this study may have important management implications for other woodland nesting birds.

Poster Presentation 10

DOES THE SEPTAL CHOLINERGIC PROJECTION TO THE AMYGDALA PLAY A ROLE IN THE SPATIAL LEARNING IN THE MALE RAT ?

Edmund Schweitzer, William Cooper, and Wayne Dornan*,
Department of Psychology, IWU

Alzheimer's disease (AD) is a neurodegenerative disorder, currently affecting over four million Americans, with 100,000 new cases reported each year. The disease is characterized by cognitive impairments, most notably memory loss throughout the earlier stages and various emotional changes as well. These deficits, although predominant in cases of AD, have yet to be shown in a reliable animal model. Studies in humans and rats report a significant correlation between the memory loss found in AD and a decline in cholinergic markers such as choline acetyltransferase (ChAT) levels in the basal forebrain and hippocampus. Therefore, lesioning cholinergic projections to these areas seems a reasonable way of replicating the profound memory deficits found in AD. In a recent study by Dornan, McCampbell, Tinkler, Hickman, Bannon, Decker, and Gunther (submitted 1995), they reported that even with a reduction of ChAT activity as a result of 192 IgG Saporin injections into the medial septal area (MSA) and nucleus basalis magnocellularis (NBM), only marginal deficits were seen in the Morris water maze and radial arm maze tasks. One putative explanation for this dilemma may be the failure of 192 IgG Saporin to destroy the cholinergic projection from the nucleus basalis magnocellularis to the amygdala. Indeed, several studies have implicated the amygdala in learning and memory in the rat. In this study, we investigated this hypothesis by injecting both 192 IgG saporin and phthalic acid into the NBM. Following postsurgical recovery, all animals were assessed on spatial learning using the Morris water maze. The results of this study will be presented at the conference.

Poster Presentation 11

FORENSIC CHEMICAL ANALYSIS OF LIPSTICK

Brian J. Roper and Forrest J. Frank*, Department of Chemistry, IWU

In the ongoing battle on crime, law enforcement officials are routinely presented with many different types of evidence at crime scenes. Evidence such as blood stains and pieces of clothing are of obvious benefits to investigators as they link subjects to crimes. But many cimes go unsolved due to lack of evidence at the scene or evidence that, due to lack of technology, is useless. Recent advances in technology and improved analytical methods have allowed scientists to begin to use evidence previously thought to be useless such as cosmetic smears. A basic analysis of major organic and inorganic constituents of cosmetic smears allow for classification of a smear as a particular product - lipstick, eyeliner, rouge, etc. For example, if upon analysis of a smear, castor oil and wax were found to be the major constituents then the smear would be classified as lipstick. Further, more in-depth chemical analysis of said cosmetics provide a link between victim, perpetrator, and crime scene and can ultimately serve as circumstantial evidence in court.

Lipstick residue and smears are the most often encountered cosmetic smears at crime scenes and therefore our research centers around analysis of the major constituents of lipstick. There is no existing national database through which lipstick can be compared and associated to one manufacturer. Therefore, it is necesary to seek similarities in compostion and color between lipstick at a crime scene and lipstick found in the possesion of a suspect. Composed of three major components - castor oil, wax, and dyes - lipstick has been analyzed through a series of extractions. Through extractions, the major components of many different lipsticks were drawn out for comparitive purposes. Comparisons of different lipsticks were performed based on three different groupings:

1. 5 lipsticks of differing colors made from the same manufacturer to determine consistency of components from one manufacturer.

2. 7 lipsticks of similar color made from 7 different manufacturers to determine consistency of components between manufacturers.

3. 3 lipsticks of similar color and made form the same manufacturer but sectioned into pieces to determine consistency of components within one stick of lipstick.

The results of these comparisons will be presented.

Poster Presentation 12

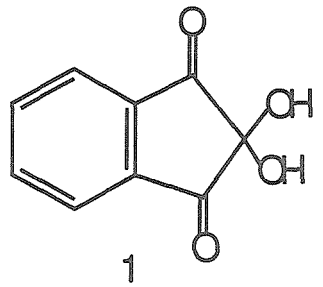
SYNTHESIS OF NEW POSSIBLE FINGERPRINT DETECTION AGENTS

Robert A. Hitchcock and Forrest J. Frank*, Department of Chemistry, IWU

Even in the age of forensic evidence such as DNA fingerprinting, the latent fingerprint remains the most highly regarded type of physical evidence. Therefore, the ability of criminal investigators to develop these fingerprints and identify the suspect is extremely important. Latent fingerprints consist of palmar sweat and other body chemicals that yield amino acids. In most cases, a developing agent is reacted with the amino acids to produce a new compound which, is often visible under a specific wavelength of light. This allows the print to be visualized, and the suspect to be identified.

The most popular compound used as a developing agent is ninhydrin (1). However, ninhydrin has flaws. For example, ninhydrin has a very low sensitivity, which means that some people will not excrete enough perspiration to leave an identifiable print. For this reason, a search for new developing agents is important.

Since ninhydrin has so many useful properties, one method of synthesizing a new developing agent is through ninhydrin analogues. This method allows the combination of ninhydrin with other compounds which may eliminate some of ninhydrin's faults. Our research involved the synthesis of two ninhydrin analogues: 6-oxo-2,4-dithio-1,2,3,4-tetrahydro-6H-indeno[2,1-g]pteridine (2). and 1,3-dimethyl-2,4,5-trioxo-1,2,3,4-tetrahydro-6H-indeno[2,1-g]pteridine (3). Both compounds have been successfully synthesized.



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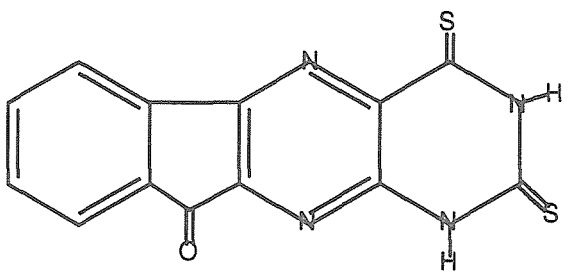

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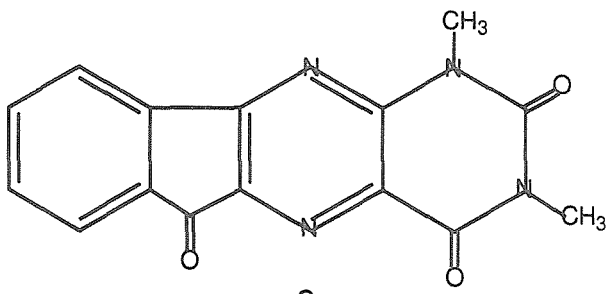

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Poster Presentation 13

TOWARDS AN EFFICIENT METHOD OF DETECTING COCAINE METABOLITE IN URINE

C.J. Summers and David N. Bailey*, Department of Chemistry, IWU

The primary metabolite of cocaine is benzoyl ecognine (BE). A desirable method for detecting cocaine use is the extraction of BE from urine into an organic phase solvent and subsequent analysis by High Performance Liquid Chromatography (HPLC). The attempt to develop such a method is hindered by the extreme water solubility of BE, making extraction into an organic phase extremely difficult. The present study attempts to use an ion-pairing agent to bind with BE and form a large, organically soluble ion-pair. The ion pairing agent used was a 1% solution of Reinecke Salt. An aqueous solution of 50 mg/mL BE was treated with the Reinecke Salt solution and then extracted with methylene chloride. Initial analysis of the extracted ion pair was performed by Ultraviolet-Visible (UV-VIS) spectrometry. The composition of BE is pH dependent; existing as a positively charged species in acid, a zwitterion in neutral solution, and a negatively charged species in base. The structural variation of BE at different pH levels was studied using the CACHe Molecular Modeling system. The pH dependence of BE results in a pH dependent ion pairing reaction; an ideal pH of 8.5 was determined. The extraction was then run with solutions of varying BE concentration. A concentration variant peak at 255 nm was discovered using UV-VIS spectrometry. The detection limit of this method and its application to HPLC will also be presented.

Poster Presentation 14

AN EMPIRICAL ANALYSIS OF DUTCH DISEASE: DEVELOPING AND DEVELOPED COUNTRIES

C. David Rudd and Pam Lowry*, Department of Economics, IWU

Dutch Disease occurs when a country discovers a substantial natural resource deposit and begins a large-scale exportation of it. As a result, the country's currency appreciates, thereby reducing the competitiveness of the country's traditional export sector. Therefore, this tradable goods sector should contract, leading to structural changes and unemployment in the economy. Neary and Van Wijnbergen (1986) develop the theoretical underpinnings by identifying the two components of Dutch Disease: the spending effect and the resource-movement effect. Using these theoretical components, the paper attempts to account for the decline in the Netherlands' manufacturing sector and Nigeria's and Indonesia's agriculture sectors. The paper uses ordinary least squares (OLS) analysis and time-series data from 1960-1990. It is shown that Dutch Disease contributed to the contraction of the countries' traditional export industries. However, the results also indicate the importance of several non-Dutch Disease factors. Finally, the paper discusses several policy implications.

Poster Presentation 15

RATS IN BLISS: A MINIMUM-DEVIATION MODEL OF RATIO SCHEDULE PERFORMANCE

Jennifer Bredthauer, Adrienne Parkhurst and James Dougan*,
Department of Psychology, IWU

The minimum-deviation theory predicts that an organism will seek to minimize the relative behavioral distance between an unconstrained baseline condition and the constrained condition caused by reinforcement schedules (Staddon, 1979). According to the minimum-deviation model proposed by Allison (1983), behavior under scheduled constraint will come as close as possible to an unconstrained "bliss point" or behavioral ideal. The present experiment examined applications of these models to fixed ratio (FR) schedules. In a previous study conducted in our lab, Witte (1994) examined the use of a minimum-deviation bliss point model for response prediction on a simple interval schedule of reinforcement. The model failed to predict the rate of responding; rats pressed a bar consistently more often than predicted by a minimum-deviation model. Although variable interval and variable ratio schedules of reinforcement have not been directly compared within the performance models, the minimum distance-models have proven successful for predicting responding on simple ratio schedules (Allison, 1983). The present study sought to substantiate the findings of previous experiments. Fixed ratio schedules such as those used in earlier research by Allison (1983) were used in conjunction with the apparatus and parameters employed by Witte (1994). Six rats were first exposed to a paired baseline procedure to establish their individual bliss points. Each rat was then exposed to a series of three variable ratio schedules: VR 10, VR 20 and VR 40. The results have implications for minimum-distance models of learning and performance.

Poster Presentation 16

PROSPECTIVE MEMORY DEFICITS IN FRONTAL LOBE PATIENTS

Michael E. Antholine and Johnna K. Shapiro*,
Department of Psychology, IWU

In the field of memory research, psychologists have recently indicated a distinct form of memory labeled prospective memory, the ability to remember to perform actions in the future. The role of attention and external cues have been implicated as determining factors in whether an individual remembers to perform an action. Many studies have focused on factors such as how the use of external cues facilitate recall, but relatively few have investigated a neurological basis for these errors in remembering. The present study attempted to investigate a possible role for the frontal lobes (and their association with attentional processes) in prospective memory errors. Frontal lobe patients, older adults, and undergraduates were asked to complete two computer-based, prospective memory tasks. The results of this research will be presented, as well as implications of this research for prevention of and therapy for prospective memory problems.

Poster Presentation 17

THE EFFECTS OF CLUMPING ON SELECTIVE ATTENTION IN VISUAL SEARCH

Kristen Lewandowski and Johnna Shapiro*, Department of Psychology, IWU

In studies of attention in visual search, older adults consistently perform more poorly than young adults. In most visual attention computer tasks, simple, conjunction, and unconfounded trials are presented randomly. We hypothesize that older adults are slower than young adults at changing their search strategies to match each type of trial. If this is the case, clumping the trials together so that the subject sees a series of each type of trial should allow the older adults to perfect their search strategies, giving them reaction times similar to those of young adults. In this experiment, 20 young adults (age 18-25) and 20 older adults (age 65 and up) will be asked to perform a clumped computer search task. These results will then be compared to the results of an unclumped study performed last year. The results will be presented.

Poster Presentation 18

AUTOMOBILE LEASING VERSUS INSTALLMENT LOAN CREDIT: A COMPARATIVE ANALYSIS

Susan E. Brown and Robert M. Leekley*, Department of Economics, IWU

In the United States, the percentage of new cars and trucks that are leased has increased from 10% in 1986 to 30% in 1995. Reinforced by increased advertising, media attention, and popular magazine articles, this tremendous surge in leasing is expected to continue. In fact, automobile market analysts predict that leasing will account for 40% of all car sales by 1998. Using an economic model of consumer choice focusing on preferences and relative prices, this paper aims to determine the factors which may lead consumers to lease a vehicle as opposed to purchasing a vehicle on traditional installment loan credit. Preference factors including liquidity, risk, and automobile use patterns are addressed. One reason consumers choose leasing over traditional installment loan credit is affordability; leasing usually requires a lower down payment and lower monthly payments. A financial analysis combines the components of a set of lease contract conditions and installment loan conditions to calculate a lease "hurdle rate" which allows for the comparison of relative prices for a given vehicle. The lease "hurdle rate" considers the initial cash savings and periodic cash savings realized in leasing as well as the residual value of the vehicle and the term of the contract. From the "hurdle rate" and investment market conditions, consumers can determine which financing option is more advantageous: leasing or purchasing on installment loan credit. In addition, factors such as tax laws, inflation, and disclosure laws are evaluated with respect to their contributions to the long-term increase in leasing.

Poster Presentation 19

A BOUNDARY QUADRATURE FORMULA FOR MULTIVARIATE INTEGRATION

Kristin Stankus, Nathan Mueggenburg, and Tian-Xiao He*
Department of Mathematics, IWU

There are many applications in which a desired integral is difficult or impossible to compute directly and furthermore all information about the function is limited to the boundary of the integral domain. In such cases we can approximate the value of the integral by using boundary quadratures.

In this project we put forward a dimensionality - reducing expansion with the highest possible algebraic accuracy and the smallest possible remainder estimation. By using this expansion, we may convert a complex integral of a high dimension to a summation of integrals of a lower dimension. We are then able to construct a boundary quadrature for each of these lower dimension integrals and thus find an approximate value for our original integral.

Poster Presentation 20

PRODUCING THE OPTIMAL LEVEL OF DISRUPTION DURING INCIDENTAL TEACHING: WHEN IS TOO MUCH AND TOO LITTLE?

Lori A. Alhambra, Department of Psychology, IWU and
Valeri Farmer–Dougan*, Department of Psychology, ISU

The disequilibrium theory (Timberlake & Farmer–Dougan, 1991) is a behavioral economic model of reinforcement that allows specific predictions about the direction and magnitude of reinforcement effects. Incidental teaching, a behavioral intervention often used to increase social and verbal behavior, is one procedure in which such predictions can be made. Recently, Farmer–Dougan and Dougan (1995) tested the reinforcement effects produced by changes in the probability of a teacher disrupting an initiation to a toy item on on–task behavior of Head Start preschoolers. Results indicated that there was an optimal level for disrupting ongoing behavior, above or below which reinforcement effects greatly suffered. The present experiment, a direct test of the disequilibrium model of reinforcement, examined whether an optimal level of disruption could be produced. Local Head Start preschoolers played with toys without interruptions (baseline) and with interruptions in which continued access to toys were made contingent upon a language response. Interruptions of ongoing play behavior were varied across four levels: 15 sec, 30 sec, 45 sec, and 1 minute. The amount of time in which the target children spent in play and response behavior were measured across sessions.

Poster Presentation 21

ST. THECLA: A WOMAN IN TRANSLATIONS HYPERTEXT AND THEORIES OF GENDER CONSTRUCTION

Betsy T. Phillips and Alison Sainsbury*, Department of English, IWU

I have created a hypertext fiction, a work that exists and can only be read in the mutli-dimensional space of the computer. This fiction is a reworking of the story of the fictitious St. Thecla, with connection to my own life—I am named for a series of Tecklas in my family. In this piece, I consciously explore how gender notions shape text, working from a french feminist theoretical perspective. I have been developing a text that unfolds multi-linearly and thus encourages new ways of knowing the text. Here I will present the results of my attempt to blend difficult theoretical issues with enjoyable fiction.

Poster Presentation 22

DETERMINATION OF COCAINE USING TETRATHIOCYANATO COBALT (II) ATE

Kevin Hansen, and David Bailey*, Department of Chemistry, IWU

A method for the indirect determination of cocaine is reported. The method invovles the formation of an ion pair of $Co(SCN)_4^{-2}$ and the main metabolite of cocaine, benzoylecgonine. The optimum pH (3.5) of the ion complex concentration and the detection limit were determined by use of Ultraviolet-Visible Spectrophotometry. The detection of the ion is also found using HPLC.

Poster Presentation 23

THE EFFECTS OF INTRACEREBRAL INJECTIONS OF A SELECTIVE CHOLINERGIC NEUROTOXIN (AF64A) ON SPATIAL LEARNING IN THE MALE RAT

Mathew Easterday, Denise Ukleja, and Wayne Dornan*,
Department of Psychology, IWU

Alzheimer's Disease (AD) is essentially caused by a massive degeneration in specific areas of the brain, most notably the hippocampus and cerebral cortex. Another characteristic of AD is the reduced production of the neurotransmitter acetylcholine. This has led to the hypothesis that the cognitive deficits associated with AD are the result of a cholinergic deficiency. One way to test this hypothesis is with the use of specific cholinergic neurotoxins. AF64A, a selective neurotoxin has been used to produce an animal model of AD. In this study, we focused on the effects of intraventricular injections of three different doses of AF64A on Morris water maze performance using a variety of spatial learning tasks in male rats. Our results reveal a dose–dependent effect of AF64A on spatial learning compared to controls. These data provide support for a cholinergic dysfunction associated with AD and further suggest that the use of AF64A, which selectively targets the cholinergic septohippocampal pathway, may provide a viable approach to study the neuropathological mechanisms of AD.

Poster Presentation 24

THE EDUCATIONAL ROLE OF SUPERNATURAL CHARACTERS IN ARTHURIAN ROMANCE

Peter J. Yagecic and Dan Terkla*, Department of English, IWU

Early medieval tales of Arthurian romance typically contain numerous otherworldly or magical characters. The continual reappearance of these supernatural creatures suggests that their inclusion is more than just an accidental plot twist. In the absence of a highly educated and well read audience, medieval authors were forced to include aspects of the supernatural into their fictional works in order keep their readers interest. The magic creatures in Arthurian literature provide an element of spectacle that could well explain the popularity of these same stories to modern audiences. The sources examined in this project include Marie de France's "Bisclavret," Chrétien de Troye's *Yvain*, and the epic poem *Sir Gawain and the Green Knight*.

In this paper, an attempt is made to prove the educational significance of these mythical creatures. Not only do they serve to educate the reader as to the author's intended moral, but the supernatural element tends to have a profound effect on the story's "normal" characters as well. In order for the hero of any given medieval romance tale to emerge victorious, he must find some kind of enlightenment along the way. More often than not, this revelation is made possible only through an encounter with a supernatural character.

Poster Presentation 25

IMMIGRANT WAGE DIFFERENTIALS IN THE UNITED STATES LABOR MARKET

William J. Takahashi and Margaret Chapman*,
Department of Economics, IWU

Amidst the contemporary political and social debate over immigration levels in the United States, many have begun to inquire about the determinants of "successful" immigration. Current economic theory suggests the importance of human capital in determining the success of immigrant assimilation into the United States labor market. Based on the work of George Borjas and Barry Chiswick, this paper develops a model which not only analyzes the effects of traditional human capital investments such as education and work experience on immigrant wages, but also attempts to address cultural and ethnic differences among immigrants. The differences in these cultural "stocks" of human capital are hypothesized to be embodied in the immigrant's language, race, political heritage and economic socialization. Using a large sample of immigrants from the National Longitudinal Survey of Youth and applying OLS regression methods to determine the relationship between human capital and immigrant wages, this paper attempts to answer the question of which personal investments and characteristics account for immigrant wage differentials. The results conclusively support existing economic theory regarding traditional human capital investments as significant factors in determining successful immigrant assimilation.

Poster Presentation 26

FACTORS AFFECTING ATTITUDE TOWARD IMMIGRANTS TO THE UNITED STATES

Shannon K. McManimon and Teodora Amoloza*,
Department of Sociology, IWU.

During the past twenty–five years, over nineteen million legal, illegal, and amnestied aliens have entered the United States. Increasing evidence suggests that Americans are growing worried about this influx of immigrants, questioning whether they are desirable for the United States. This study examined how respondents' levels of education and attitudes toward the nation's economy affected their attitudes toward immigrants. The survey was conducted on two levels: local data taken from a survey of 112 Bloomington–Normal, Illinois, residents in the fall of 1995 and a secondary analysis of the 1994 General Social Survey data from the National Opinion Research Center. On the local level, neither level of education nor attitude toward the nation's economy had a significant effect on attitude toward immigrants. There was, however, a definite trend concerning education: those with higher education, particularly the males, were more likely to have a positive attitude toward immigrants. Attitude toward the nation's economy was probably not a factor affecting attitude toward immigrants because Bloomington–Normal is a solidly homogenous upper–middle class community, which may indicate that it has not been very impacted by recent negative economic trends. On the national level, both those with higher levels of education and those who felt that the nation's economy had improved over the past year were significantly more likely to have positive attitudes toward immigrants. Additionally, these same results were obtained after controlling for gender. The implications, especially regarding economics, that these findings suggest are important to the country as a whole. As the number of immigrants continues to grow, it is essential that the government be aware of these national attitudinal trends in order to address growing economic concerns. These trends must also be addressed in order for United States citizens to accept immigrants socially.

Poster Presentation 27

THE EFFECTS OF MULTIPLE INJECTIONS OF ß–AMYLOID (25–35) INTO THE MEDIAL SEPTAL AREA ON SPATIAL LEARNING IN THE MALE RAT

Jonathan Litwiller and Wayne Dornan*, Department of Psychology, IWU

Alzheimer's Disease (AD) is a progressive, irreversible neurological disorder that has a profound effect on memory and personality. Although when it was first diagnosed by the physician Alois Alzheimer in 1907 AD was considered a rare disorder, it is now recognized as the most common form of dementia affecting an estimated 4 million American Adults. Most people diagnosed with AD are older than 65; however, AD can occur in people in theirs 40s and 50s. The pathological hallmarks of AD is the neuritic plaque (comprised of ß–amyloid), and the neurofibrillary tangle (comprised of an abnormally phosphorylated tau protein. Only a few years ago, ß–amyloid was thought to be an inert deposit devoid of biological activity. Accumulating research, however, strongly suggests that ß–amyloid initiates a cascade of events culminating in the death of the nerve cell. One focus of this laboratory over the last two years has been to inject a variety of amyloid fragments into the hippocampus, and assess the effects of these injections on a variety of spatial learning tasks in the rat. In order to expand on previous findings in our laboratory, in this study male rats received multiple injections of ß–amyloid (25–35) into the medial septal area. Following a post surgical recovery period all animals were tested for spatial learning using the radial arm maze. The results of this study will be presented at the conference.

Poster Presentation 28

SYNTHESIS OF AN ORGANOPHOSPHORUS ANALOG OF ACETYLCHOLINE

Jay-James R. Miller and Jeff Frick*, Department of Chemistry, IWU

Acetylcholine (ACh) is the most widely studied of all neurotransmitter substances. For normal nerve function, the enzyme acetylcholinesterase (AChE) must hydrolyze ACh into its basic chemical constituents, choline and acetate. AChE is readily inhibited by organophosphorus (OP) compounds like sarin and soman--both nerve gases--as well as various pesticides. OP compounds, therefore, have been widely used to study the mechanism of ACh hydrolysis via AChE. Recent studies examining the stereoselectivity of that process, however, have yielded conflicting results. Hence, it is hoped that new studies with a novel OP analog of ACh will provide definitive information about the stereoselectivity of the mechanism of AChE action. Obviously, the first phase of this project must be the synthesis of that novel OP inhibitor. We present our efforts in this area and outline future directions.

Poster Presentation 29

MACROELEMENTS AND ORTHOGONAL MULTIRESOLUTIONAL ANALYSIS

Jonathan M. Corbett and Tian-Xiao He*, Department of Mathematics, IWU

Orthogonal multiresolutional wavelet analysis in two dimensions furnishes a basis for wavelet analysis. Bernstein-Bezier polynomials over simplexes provide elegant expressions of the necessary and sufficient conditions for a shift invariant space generating an orthogonal multiresolution analysis. In order to give the expression a formula of the inner product of two Bernstein-Bezier polynomials over a simplex has been derived:

$$\langle P_n, Q_n \rangle = \int_S P_n Q_n(X) dX = s\,\Delta_s \frac{(n!)^2}{(2n+s)!} \sum_i \sum_j a_i b_j \prod_{k=1}^{s} \binom{ik + j_k}{ik}$$

where V_s is the volume of the s-dimensional simplex S, $\mathbf{i} = i_1+i_2+\ldots+i_S$, $\mathbf{j} = j_1+j_2+\ldots+j_S$, and $\mathbf{a_i}$ and $\mathbf{b_j}$ are respective Bernstein-Bezier coefficients of P_n and A_n. We also give the needed expression by using the formula above.

Poster Presentation 30

LIVING WITH UNSTABLE CORONARY ARTERY DISEASE

Marcie Tempel and Kathryn Scherck*, School of Nursing, IWU

Coronary artery disease (CAD) remains a leading cause of mortality and morbidity in the United States. CAD can be a long term, recurrent health problem placing a heavy burden on the afflicted individual. Although the mean age of individuals experiencing their first clinical symptoms of CAD is usually reported to be in the fifth or sixth decade of life, individuals may also experience symptoms of disease at an earlier age when actively engaged in career, family, and vigorous leisure activities. There is a sparsity of experiential information and nurses need to be sensitive to the psychosocial impact of this experience on daily living. This study proposes to examine the lived experience of one middle-aged man with unstable CAD using qualitative research methods.

Poster Presentation 31

STEINER MINIMAL TREES OVER GENERALIZED CHECKERBOARDS

Meta Voelker and Robin Sanders*, Department of Mathematics, IWU

Given n randomly placed points in the plane, how can these points be connected by a network of minimum length? Using graph theory, the answer lies in the formation of a minimum spanning tree. If additional points can be added to the tree, then the minimum spanning tree can often be shortened even further, resulting in what is known as a Steiner minimal tree (SMT). Unfortunately, there exists no simple algorithm for finding SMTs. Chung, Gardner, and Graham partially examined this problem by attempting to build SMTs over regular lattices in "Steiner Trees on a Checkerboard" (Mathematics Magazine, V. 62, #2). Using their paper as a basis, I examine some of their results and generalize their ideas to rhombuses.

Poster Presentation 32

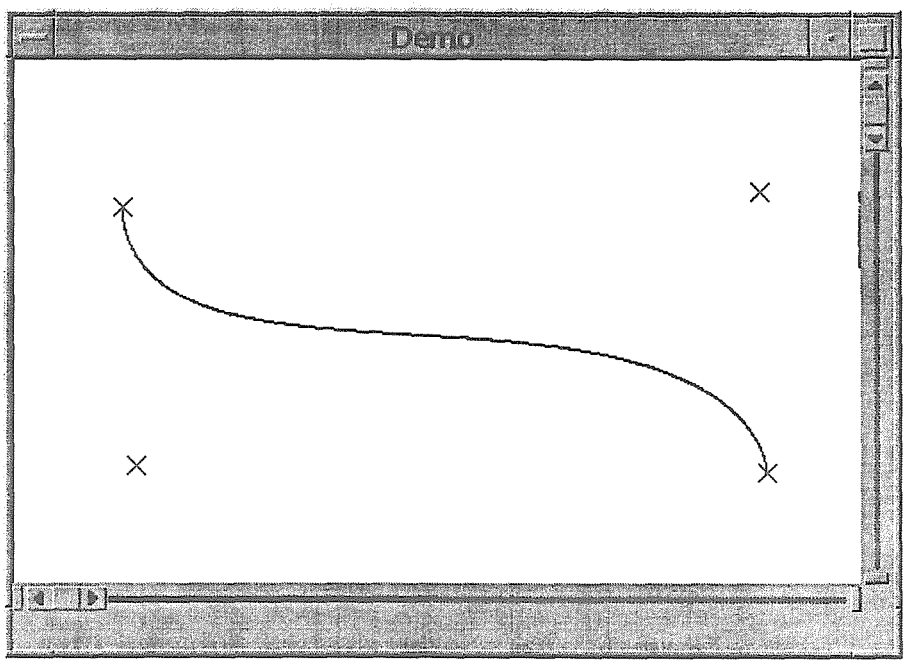
A BEZIER-BASED SYSTEM FOR CAGD

Patrick Crowley and Lon Shapiro*, Department of Computer Science, IWU

Bezier curves are the foundation of modern computer aided geometric design. A Bezier curve is a polynomial curve expressed in terms of Bernstein polynomials. A Bernstein polynomial is defined as

$$B_i^n(t) = \binom{n}{i} t^i (1-t)^{n-i}.$$

Much like lines and polygons require only end-points and vertices, a Bezier curve requires only a control polygon to completely define the curve (see example below, control points are indicated by X's). Bezier curves are invariant under affine transformations. In particular, affine invariance allows dilations and transformations to be applied to the control points only rather than all of the points on the curve. Since Bezier curves are defined as polynomial curves of arbitrary degree, they may be used to represent lines and other non-linear, higher-order polynomial curves. To this end, a design application has been created using Bezier curves to represent the graphics primitives. Points, lines, and higher-order curves may be designed and edited interactively. The project was developed for X-windows with the object-oriented language C++. The resulting application is a 2-d design package in which all data are represented as Bezier curves. The design application will be available for demonstration and evaluation.



Poster Presentation 33

IMMUNOLESIONS OF THE CHOLINERGIC MEDIAL SEPTAL AREA INDUCED BY INJECTIONS OF 192 IGG SAPORIN HAVE NO APPRECIABLE EFFECT ON SPATIAL LEARNING IN THE MALE RAT

Mary Kern and Wayne Dornan*, Department of Psychology, IWU

Alzheimer's Disease (AD) is a progressive, neurodegenerative disorder that has already reached epidemic proportions. Indeed, AD is the fourth leading cause of death in adults, after heart disease, cancer and stroke, and is the most common form of dementia. Although most people diagnosed with AD are older than 65, AD can occur in people in their 40s and 50s. Over the past 2 years research in this laboratory has focused on developing an animal model of AD by mimicking the loss of the basal forebrain cholinergic projection using a variety of lesion techniques, and to determine how the loss of the fibers affect learning and memory in the rat. While a considerable amount of evidence has implicated the loss of cholinergic basal forebrain (CBF) input to the hippocampus and cortex as being one of the major neuropathological components characteristic of AD, the exact role the CBF system plays in the cognitive deficits observed in Alzheimer's disease is still uncertain. One factor that has contributed to this ambiguity is that until recently the lack of a specific cholinergic neurotoxin has hindered attempts to selectively destroy the cholinergic input to the cortex and hippocampus. As a result, there is considerable excitement regarding the introduction of the new cholinergic toxin, 192 IgG saporin as a potential new tool in generating an animal model that mimics the profound memory impairment that characterizes Alzheimer's disease. Unilateral injections of 192 IgG saporin into the lateral ventricles induces within 3–5 days, a 80–90% reduction of acetylcholine levels in the cortex and hippocampus. In this study animals received three stereotaxic injections of 192 IgG saporin into the medial septal area and the effects of these injections on a variety of spatial learning tasks were assessed. Our preliminary results indicate that intracerebral injections of 192 IgG saporin failed to appreciably effect the retention or acquisition of a spatial learning task despite a considerable depletion of acetylcholine. The significance of these results will be presented at the conference.

Poster Presentation 34

BACTERIA IN HOUSE WREN (*Troglodytes aedon*) NESTS

David R. Singleton and R. Given Harper*, Department of Biology, IWU

Nest ectoparasites such as mites, fleas, fly larvae, etc., have been studied extensively as selective agents in the evolution of life history traits in several species of birds. The potential influence of bacterial populations in nests, however, has not been investigated. In this study we are examining used House Wren nests to document the presence of bacterial species, some of which may be potential pathogens. Standard microbial techniques are currently being utilized to identify bacteria isolated from the nests. The presence of pathogens in the nest may help explain the particular behavior of male House Wrens and other cavity nesting birds in removing old nests from nesting sites before beginning the construction of new nests.

Poster Presentation 35

CHOLINERGIC IMMUNOLESIONS OF THE MEDIAL SEPTAL AREA USING 192 IGG SAPORIN INDUCE A DIFFERENTIAL SENSITIVITY OF MUSCARINIC AND NICOTINIC RECEPTORS ON SPATIAL LEARNING IN THE MALE RAT

Sara Russell and Wayne Dornan*, Department of Psychology, IWU

Epidemiological studies indicate that the clinical entity known as Alzheimer's disease (AD) currently afflicts approximately 4 million people in the United States, with roughly 100,000 new cases diagnosed each year. This disorder typified by profound cognitive impairments, can also result in global personality changes as well. The most prominent feature of AD, particularly in the early stages, is memory loss. While significant progress has been made toward an understanding of the etiology of AD, presently no reliable animal model exists that mimics the profound pathological and behavioral changes that characterize the disease. A considerable amount of evidence has implicated the loss of cholinergic input to the hippocampus and cortex as being one of the major neuropathological components corresponding to the learning and memory deficits characteristic of AD. Therefore, one approach that this lab has taken toward the development of an animal model of AD is to mimic the loss of the cholinergic projection to the hippocampus and cortex using a variety of lesion techniques, and to determine how the loss of these fibers affect learning and memory in the rat. The most prominent cholinergic projection in the mammalian basal forebrain, is a projection from the medial septal area (MSA) to the hippocampus, in addition to a cortical projection that originates from the nucleus basalis magnocellularis (NBM). Collectively, these two areas account for approximately 80– 90 % of the cholinergic input to the hippocampus and cortex respectively. Considerable evidence suggests that, on the average, lesions of the MSA or NBM, induce substantial spatial learning impairments on both the Morris Water Maze, and radial arm maze. These impairments are associated with marked reductions in choline acetyltransferase (ChAT), which is an index of cholinergic activity. As a result, a cholinergic deficiency in the basal forebrain has been proposed to account for the cognitive deficits observed in AD. In this study we assessed the functional integrity of the cholinergic receptor system on spatial learning in animals that had received multiple injections of the immunotoxin 192–IgG saporin directly into the MSA. Our results reveal an increased sensitivity to muscarinic receptors but not nicotinic following 192 IgG saproin lesions of the MSA and further suggest a dissociation between the effects of muscarinic and nicotinic agents on spatial learning in rats. To our knowledge this is the first study that has examined the effects of muscarinic vs nicotinic agents in 192 IgG saporin lesioned animals. It is hoped that further research in this area will provide an avenue to test novel therapeutic drugs to be used as a palliative treatment for Alzheimer's disease.

Poster Presentation 36

DAILY ADMINISTRATION OF PHYSOSTIGMINE DOES NOT AMELIORATE THE SPATIAL LEARNING IMPAIRMENTS INDUCED BY AF64A

Trey Folkers, James Bedrosian, and Wayne Dornan*,
Department of Psychology, IWU

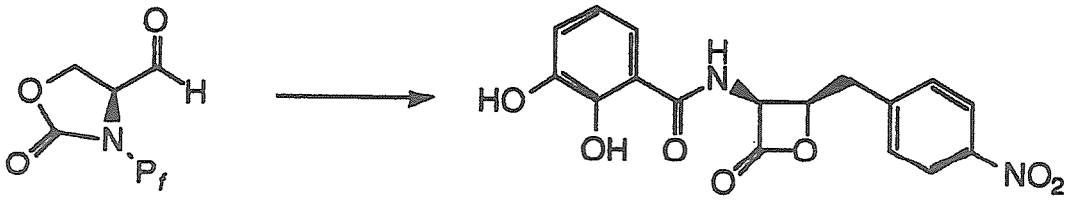
Alzheimer's Disease (AD) is a progressive degenerative disorder of the brain clinically manifested by cognitive deterioration. It usually begins in later life (> 65 years old), and results in death in about 3 to 10 years. Although originally thought to be a rare disease, AD has now reached startling proportions. It has been estimated that approximately 4 million Americans have AD, 19 million Americans say they have a family member with AD, and 37 million know someone with AD. Although significant progress has been made toward understanding the etiology of AD, presently there is no known cause or treatment. Pathologically AD is characterized by a profound deficiency of the neurotransmitter, acetylcholine. As a result, an intense research effort revolves around palliative strategies using drugs that effect the cholinergic system. Presently, studies using "cholinergic enhancers" have produced the most encouraging results. In another study presented at this conference we found a dramatic impairment in spatial learning in animals treated with the cholinergic neurotoxin, AF64A. In this study we attempt to ameliorate the spatial learning deficits induced by AF64A by using the acetylcholinesterase inhibitor, physostigmine. Our preliminary results indicate that compared to controls, daily treatment of an acetylcholinesterase inhibitor does not improve performance on a spatial learning task in AF64A lesioned animals. The implications of these results for future treatment strategies regarding AD will be discussed at this conference.

Poster Presentation 37

SYNTHESIS AND NUCLEOPHILIC ADDITION REACTIONS OF A SERINE DERIVED AMINO ALDEHYDE

William J. Flosi and Jeff Frick*, Department of Chemistry, IWU

The synthesis of the antibiotic (+)-obafluorin 2, isolated from strains of *Psuedomonas fluorescens*, is being explored. A precursor in the overall proposed synthesis is the serine derived amino aldehyde 1. The synthesis of compound 1 and several nucleophilic addition reactions to the aldehyde has been investigated. The results of these experiments will be presented.



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Poster Presentation 38

TESTOSTERONE AND ESTROGEN LEVELS WITHIN AND BETWEEN CLUTCHES OF HOUSE WREN (*TROGLODYTES AEDON*) EGG YOLKS

Kimberly Fryzel, Brook Waggoner, R. Given Harper*, Department of Biology, IWU, and David W. Borst*, Department of Biology, ISU

The embryonic chick inherits maternal resources for development, including steroid hormones, which pass from female circulation to the offspring during egg formation (Schwabl 1993). Variations in the concentrations of these hormones, and more specifically testosterone and estrogen, may affect the likelihood that certain behavioral, physiological, and morphological traits will be expressed (e.g. Baptista et. al. 1987, Wingfield et. al. 1987, Wingfield et. al. 1990, Ketterson and Nolan 1992). Recent study has revealed the existence of a positive correlation between the social rank of juvenile canaries (*Serinus canaria*) and the concentration of yolk testosterone in the eggs from which they hatched (Schwabl 1993). This finding suggests that the competitive ability of offspring may be a reflection of the amount of maternal testosterone deposited in the yolk. Thus, a female may potentially determine the competitive ability of her offspring by varying the amount of testosterone imparted to them. In addition, studies analyzing estrogen levels in the adult bird have revealed that estrogen influences neural circuits during brain development that are involved in male song learning and production (Gahr et. al. 1993, Schlinger 1994, Adkins-Regan et. al. 1995). Because attraction of mates is often aided by the display of sex differences such as song, a mother's control of estrogen at the embryonic level may potentially influence the reproductive success of her offspring and her overall fitness. If a female maintains such control over the reproductive behavior and competitive ability of her offspring, then different levels of estrogen and testosterone should be detected among eggs of a clutch. Using radioimmunoassay analysis to quantify hormone levels, this study proposes to determine whether yolk testosterone and estrogen levels vary within and between clutches of house wren (*Troglodytes aedon*). The existence of this phenomenon has not been documented in populations of wild birds.

Poster Presentation 39

DEVELOPMENT OF A RAPID METHOD TO DETERMINE BENZOYLECGONINE IN URINE

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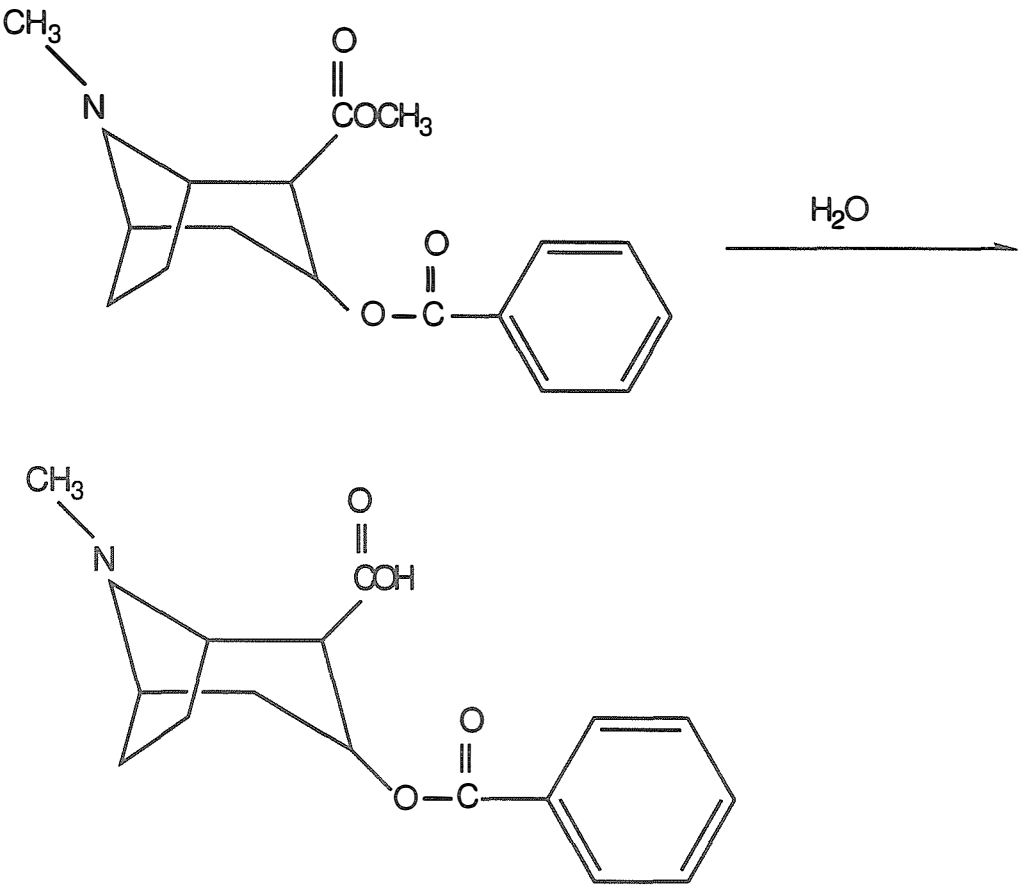
This study has involved the development of a more inexpensive way to screen a large number of samples rapidly for benzoylecgonine, (BE) the body's main metabolite of cocaine, in urine. This method incorporates the use of the ion pairing reagent, tetraiodobismuthate or BiI_4^- , to aid in the extraction of BE from urine into methylene chloride. This extract is then injected into the HPLC for quantification. Figure 1 shows the hydrolysis of cocaine to its metabolite, benzoyl ecgonine.

FIGURE 1. The Hydrolysis of Cocaine



STUDENT PARTICIPANTS